DOCUMENT RESUME

ED 147 478 08 CE 013 246

TITLE Summary of Proceedings. Project 2000 Forum for Agricultural Education in Iowa (Ames, Iowa, February 24-25, 1976).
INSTITUTION Iowa State Univ. of Science and Technology, Ames. Dept. of Agricultural Education.
SPONS AGENCY Office of Education (DHEW), Washington, D.C.
PUB DATE Feb 76
NOTE 80p.; For related documents see CE 013 244-247

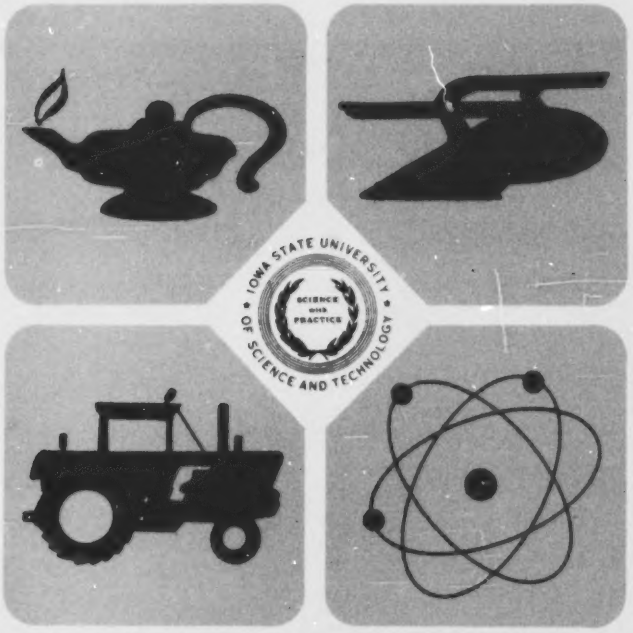
EDRS PRICE MF-$0.83 HC-$4.67 Plus Postage.
DESCRIPTORS *Agribusiness; *Agricultural Education; *Agricultural Trends; Curriculum Development; *Economic Change; *Educational Trends; Sociology; Trend Analysis
IDENTIFIERS Project 2000

ABSTRACT

Outlines or summaries of twelve speeches and related group discussions are presented from a meeting to identify future trends in sociology, economics, and education and to discuss these trends in light of future program purposes and direction of agriculture and agribusiness education. The forum was part of a larger project to develop principles and strategies for agriculture and agribusiness education in Iowa. Topics covered include agriculture and world food production, vocational and career decision making, labor, and other economic and social issues. On-farm and off-farm agricultural developments and directions are discussed individually as are educational, sociological, economic, ecological, and political trends. Implications are outlined for program restructuring, for curriculum, and for teaching approaches. (Complete texts of the speeches and panel discussions are also available--CE 013 247.) (JT)

**********
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
**********

ED147478




# PROJECT 2000 FORUM
# SUMMARY OF PROCEEDINGS

## FOR AGRICULTURAL EDUCATION IN IOWA

DEPARTMENT OF AGRICULTURAL EDUCATION

February 24 and 25, 1976

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

CE 013 246

TABLE OF CONTENTS


| | Page |
|---|---|
| Purpose | 1 |
| Forum Participation | 1 |
| Project Staff | 2 |
| Advisory Committee | 2 |
| Project Consultants | 2 |
| Agricultural Education Staff, ISU | 2 |
| Speakers and Topics | 3 |
| Listening Panelists | 4 |
| Program | 5 |
| Outlines of Presentations, Project 2000 Forum | 9 |
| J. Merrill Anderson | 10 |
| Keith C. Barrons | 14 |
| Glenn W. Burton | 18 |
| Michael V. Nevitt | 24 |
| Robert J. Havighurst | 28 |
| H. B. Gelatt | 41 |
| Paul Holmer | 46 |
| Rupert Evans | 49 |
| Dennis R. Starleaf | 52 |
| Douglas Ensminger | 55 |
| Harold Halcrow | 63 |
| Ralph W. Tyler | 66 |
| Listening Panel Reports, Project 2000 Forum | 68 |
| Responsibilities of Listening Panel | 69 |
| Future Developments and Directions | 70 |

On-Farm Agricultural Developments and Directions . . . . . 70

Off-Farm Agricultural Developments and Directions . . . . . 70

Educational Developments and Directions . . . . . 70

Sociological Developments and Directions . . . . 71

Economic Developments and Directions . . . . . 72

Ecological Developments and Directions . . . . . 72

Political Developments and Directions . . . . . 73

Implications of Future Developments and Directions . 74

Implications for Program Restructuring . . . . . 74

Implications for Curriculum . . . . . 75

Implications for Teaching Approaches . . . . . 76

## PURPOSE OF THE FORUM

The PROJECT 2000 FORUM was intended to be a meeting of professionals to identify future trends in sociology, economics, and education and to discuss these trends in light of future program purposes and direction of agriculture and agribusiness education.

There were three important components of the FORUM. First, twelve noted specialists in the fields of education, agriculture, developmental psychology, business, sociology, morality, and economics made presentations inspired by what they saw as prominent, future changes in their respective disciplines. Secondly, a listening panel of selected agricultural educators from across Iowa and the United States probed the specialists on those matters that were identified as important in agriculture and agribusiness education. Thirdly, there were round-table discussions and interactions by all specialists and listening panel members in order to place those identified trends in perspective to each other.

This review and analysis of current program purposes of agriculture and agribusiness education in terms of projected social, agricultural, cultural, economic, educational, and occupational changes resulted in a revised philosophical base, for the foundation of curriculum development in agriculture and agribusiness education.

This FORUM was but one phase of a U. S. Office of Education curriculum development project administered through the Department of Agricultural Education, Iowa State University.

## FORUM PARTICIPATION

All sessions of this FORUM were open for public attendance, and there was no conference fee. However, all but official FORUM participants were required to absorb their own room and meal costs. Official FORUM participants included invited speakers, listening panel, Project 2000 staff, Iowa State Agricultural Education Staff, and the Project 2000 Advisory Committee.

Public participation in interaction discussions was limited during presentations, but any person was allowed to take an active part in the large group interaction sessions.

Presentations were of interest to secondary and post-secondary agricultural educators, university personnel in related disciplines, and state department of public instruction staffs, as well as other people who would be involved in the future of agriculture and agribusiness education.

Persons interested in attending the FORUM were asked to complete and return a pre-registration form, indicating those presentations that they desired to hear, and sessions they wished to attend.

PROJECT STAFF

Alan A. Kahler
James Leising
Tom Archer
John Magill

Conference Secretary,
Worth Haynes

PROJECT CONSULTANTS

William Stanley,
Bellaire Bluffs, Florida

Ralph Tyler,
Chicago, Illinois

Gordon Swanson,
Minneapolis, Minnesota

AGRICULTURAL EDUCATION STAFF

Harold Crawford, Head
Bennie Byler
Thomas Hoerner
Alan Kahler
David Williams
Clarence Bundy, Professor Emeritus
Tom Archer
Gary Briers
Richard Carter
Winston Haye
Worth Haynes
Duane Kaas
James Leising
John Magill
Doug Pals

ADVISORY COMMITTEE

James Athen, Department of Public Instruction

Clarence Bundy, Professor Emeritus

Harold Crawford, Iowa State University

Emeron Dettman, Department of Public Instruction

George Kizer, Iowa State University

Eleanore Kohlmann, Iowa State University

Anton Netusil, Iowa State University

Reginald Soldwish, South Hamilton Community High School

Joe White, Ellsworth Community College

AGRICULTURAL EDUCATION GRADUATE STUDENTS

Mr. Lee Cole
Mr. Neil Hernan
Mr. Jim Hilton
Mr. Martin Limbird
Mr. Mark Patton
Mr. Prince Preyer
Mr. Curt Schaub
Mr. Abdel Sharshar
Mr. Tom Silletto

THIRD PARTY EVALUATORS

Mr. Bill Klug
Mr. Harlan Giese

U. S. OFFICE OF EDUCATION

Mr. Les Thompson, Kansas City

| SPEAKERS | TOPICAL AREAS |
|---|---|
| Mr. Merrill Anderson<br>Central National Bank<br>Des Moines, Iowa | "Agricultural Trends, Issues and New Directions in Iowa" |
| Dr. Keith Barrons<br>Dow Chemical Corporation<br>Midland, Michigan | "Advances and New Directions in Technical Agriculture" |
| Dr. Glen Burton<br>USDA--ARAS<br>Georgia Coastal Plain Experiment Station | "Trends, Problems, and Issues Ahead in in World Food Production" |
| Dr. Douglas Ensminger<br>Department of Sociology<br>University of Missouri | "Social Trends, Issues, and New Directions in America" |
| Dr. Rupert Evans<br>Bureau of Educational Research<br>University of Illinois | "Labor Trends and Needs of Society During the Next Decades" |
| Dr. H. B. Gelatt<br>American Institute of Research<br>Palo Alto, California | "Changing Patterns of Vocational and Career Decision Making" |
| Dr. Harold Halcrow<br>Department of Economics<br>University of Illinois | "Contributions of Agricultural Business and Industries to State, National, and World Economies" |
| Dr. Robert Havighurst<br>Department of Education<br>University of Chicago | "Changing Developmental Needs of Secondary and Post-Secondary Youth" |
| Dr. Paul Holmer, Head<br>Yale Divinity School<br>New Haven, Connecticut | "New Moralities and Old: A Reconsideration" |
| Dr. Michael Nevitt<br>Argonne National Laboratories<br>Argonne, Illinois | "Significant Scientific Trends, Issues, and Developments in America" |
| Dr. Dennis Starleaf<br>Department of Economics<br>Iowa State University | "Economic Trends, Issues, and New Directions in America" |
| Dr. Ralph Tyler<br>Science Research Associates<br>Chicago, Illinois | "Trends, Issues, and New Directions in American Education" |

LISTENING PANELISTS

Dr. Ralph Bender, Head
Department of Agricultural Education
Ohio State University

Dr. Harold Crawford, Head
Department of Agricultural Education
Iowa State University

Mr. George Cummins, Instructor
Hawkeye Institute of Technology
Waterloo, Iowa

Mr. Harold Gamm
Des Moines Area Community College
Ankeny, Iowa

Mr. Ronald W. Jeffries
Florida Department of Education
Tallahassee, Florida

Mr. Steve Jorgensen
Vocational Agriculture Instructor
Rolfe, Iowa

Dr. Darrell Parks
Ohio Department of Education
Columbus, Ohio

Dr. Milo Peterson
Department of Agricultural Education
University of Minnesota

Dr. Richard Smith
State Department of Public Instruction
Des Moines, Iowa

Dr. Gordon Swanson
Department of Agricultural Education
University of Minnesota

Mr. Clifford Van Berkum
Vocational Agriculture Instructor
Swea City, Iowa

Listening Panel Chairman
Clarence E. Bundy
Department of Agricultural Education
Iowa State University

PROGRAM
Project 2000 Forum
for Agricultural Education in Iowa

Monday, February 23
Memorial Union

Afternoon
Arrival and check-in at the Memorial Union, Iowa State University

| | | |
|---|---|---|
| 6:45 p.m. | Dinner | Oak Room |
| | Welcome | Dr. Harold Crawford, Head<br>Agricultural Education Department<br>Iowa State University |
| | Introductions and<br>General Comments | Dr. Alan A. Kahler<br>Project Director |
| | Announcements | Mr. Worth Haynes<br>Forum Secretary |
| 8:00 p.m. | Forum Orientation | |
| Room 201 | Forum Speakers | Dr. Alan A. Kahler<br>Project Director |
| Room 205 | Listening Panel | Professor C. E. Bundy<br>Chairman, Listening Panel |

Tuesday, February 24
Scheman Continuing Education Building

Session 1
Mr. James Leising, Chairman
Iowa State University

| | | |
|---|---|---|
| 8:00-8:40 a.m. | Agricultural Trends, Issues<br>and New Directions in Iowa | Mr. Merrill Anderson<br>Central National Bank<br>Des Moines, Iowa |
| 8:40-9:20 | Advances and New Directions<br>in Technical Agriculture | Dr. Keith Barrons<br>Dow Chemical Corporation<br>Midland, Michigan |
| 9:20-9:50 | Interaction--Listening Panel with above speakers | |
| 9:50-10:10 | Coffee Break | |

Session 2
Mr. Joe White, Chairman
Ellsworth Community College

| | | |
|---|---|---|
| 10:10-10:50 | Trends, Problems, and Issues Ahead in World Food Production | Dr. Glenn Burton<br>USDA--ARAS<br>Georgia Coastal Plain Experiment Station |
| 10:50-11:30 | Significant Scientific Trends, Issues, and Developments in America | Dr. Michael Nevitt<br>Argonne National Laboratory<br>Argonne, Illinois |
| 11:30-12:00 | Interaction--Listening Panel with above speakers | |
| 12:00-1:00 p.m. | Lunch | Rooms 204-208 |

Session 3
Mr. Tom Archer, Chairman
Iowa State University

| | | |
|---|---|---|
| 1:00-1:40 p.m. | Changing Developmental Needs of Secondary and Post-Secondary Youth | Dr. Robert Havighurst<br>College of Education<br>University of Chicago |
| 1:40-2:20 | Changing Patterns of Vocational and Career Decision-Making | Dr. H. B. Gelatt<br>American Institute of Research<br>Palo Alto, California |
| 2:20-2:50 | Interaction--Listening Panel with above speakers | |
| 2:50-3:10 | Coffee Break | |

Session 4
Mr. James Athen, Chairman
State Department of Public Instruction

| | | |
|---|---|---|
| 3:10-3:50 | New Moralities and Old: A Reconsideration | Dr. Paul Holmer<br>Yale Divinity School<br>New Haven, Connecticut |
| 3:50-4:30 | Labor Trends and Needs of Society During the Next Decades | Dr. Rupert Evans<br>Bureau of Educational Research<br>University of Illinois |
| 4:30-5:00 | Interaction--Listening Panel with above speakers | |

Ames Country Club

Session 5
Dr. Harold Crawford, Chairman
Iowa State University

6:30 p.m. Dinner

7:30 Total Interaction--Open to the Public

| Group | Group Interaction Leaders | Group Interaction Secretaries |
|---|---|---|
| Group 1 | David Williams, ISU | Lee Cole, ISU |
| Group 2 | Thomas Hoerner, ISU | Gary Briers, ISU |
| Group 3 | Emeron Dettman, DPI | Douglas Pals, ISU |
| Group 4 | Bennie Byler, ISU | Jim Hilton, ISU |

Wednesday, February 25
Scheman Continuing Education Building

Session 6
Mr. John Magill, Chairman
Iowa State University

| | | |
|---|---|---|
| 8:00-8:40 a.m. | Economic Trends, Issues, and New Directions in America | Dr. Dennis Starleaf<br>Department of Economics<br>Iowa State University |
| 8:40-9:20 | Significant Social Trends, Issues, and New Directions in America | Dr. Douglas Ensminger<br>Department of Sociology<br>University of Missouri |
| 9:20-9:50 | Interaction--Listening Panel with above speakers | |
| 9:50-10:10 | Coffee Break | |

Session 7
Dr. Eleanore Kohlmann, Chairman
Iowa State University

| | | |
|---|---|---|
| 10:10-10:50 | Contributions of Agricultural Business and Industry to State, National, and World Economies | Dr. Harold Halcrow<br>Department of Economics<br>University of Illinois |
| 10:50-11:30 | Trends, Issues, and New Directions in American Education | Dr. Ralph Tyler<br>Science Research Associates<br>Chicago, Illinois |
| 11:30-12:00 | Interaction--Listening Panel with above speakers | |
| 12:00-1:10 p.m. | Lunch Rooms 204-208 | |

Session 8
Dr. Harold Crawford, Chairman
Iowa State University

| | | |
|---|---|---|
| 1:15-3:15 p.m. | Speakers and Listening Panel Interaction | |
| 3:15-3:30 | Summary and Concluding Remarks | Dr. Alan Kahler<br>Project Director |
| 3:30-4:00 | Work Session--Listening Panel | Room 254 |

Session 9
Prof. C. E. Bundy, Chairman
Iowa State University

Memorial Union

| | | |
|---|---|---|
| 6:30 p.m. | Dinner and Discussion for Listening Panel Only | Regency Room |
| 7:30 | Work Session for Listening Panel | Room 205 |

Thursday, February 26
Scheman Continuing Education Building
Room 254

Session 10
Prof. C. E. Bundy, Chairman
Iowa State University

| | |
|---|---|
| 8:00-12:00 | Listening Panel Work Session |

Room 208

Session 11
Dr. Alan A. Kahler, Chairman
Iowa State University

| | | |
|---|---|---|
| 12:00-1:00 p.m. | Lunch | |
| 1:00 | Listening Panel Report to Project Staff | Prof. C. E. Bundy,<br>Chairman, Listening Panel |
| 2:00 | Adjourn | |

# OUTLINES OF PRESENTATIONS

## Project 2000 Forum

# Agricultural Trends, Issues, and New Directions in Iowa

J. Merrill Anderson
Central National Bancshares, Inc.
Des Moines, Iowa

A. Agricultural Trends

1. Growing number of family operations--formal or informal--where individual members specialize in one phase of production (crops or livestock).

2. Growth in group marketing concept--cattle feedlot sales program, FGDA grain marketing pool, Vinton quality grain marketing direct for exports.

3. Expanded use of computers to determine feasibility and profitability of farming practices and expansion.

4. Farming as a business.

   a. Less a way of life for farm operations; but growing interest by others in rural living.

   b. Competition for land, zoning problems, odor control, etc.

5. Increasing influence of consumers and consumerism on industry.

   a. Including the agricultural industry.

   b. On prices.

   c. Controls.

   d. Legislation.

   e. Taxes, imports, exports.

6. Increasing influence of the press.

   a. Young reporters with expert training in investigative procedures and abilities to use words effectively.

   b. Sometimes have had little actual experience in the fields on which they are reporting but have power because of widespread circulation of their views through media.

   c. Consumers with little background in a particular industry dependent upon reporting. Facts are not always what they SEEM.

7. Increasing land values very much in the press.

   a. Sales of land often based on factors other than productivity--development for residential--availability to neighboring farmer who has invested heavily in machinery and needs additional land to make it economically sound--only chance during his lifetime to add to his spread.

   b. Values not based on productivity of the land or its return to the owner.

   c. Most of the "millionaire farmers" recently referred to in a front-page article of Iowa's largest newspaper are millionaires on paper--land worth large amount, but in order to get it would have to sell the farm at top prices--so only way to become a millionaire farmer is to get out of farming.

B. Issues

1. Agriculture to continue in the public eye as consumers are concerned about food production, quality and prices of food, exports, conservation and environment. This will require a greater emphasis on communication skills for farmers who can also utilize these skills in dealing with top management in banking, farm supply production and food production.

2. Growing public dissatisfaction with soil erosion from fall plowing and similar environmental problems.

3. Exit-entry problem will get worse instead of better unless more progress is made in improving farm business organizational structure and in changing tax structure.

4. Are we headed for continual emphasis in crop production and a reduced emphasis in livestock production?

   a. If so, what are the implications for Iowa's economy, the number of family farms needed, the meat processing industry, etc?

   b. In 1969, cash farm receipts in Iowa from livestock accounted for 75 percent of the total with crops accounting for 25 percent.

   c. In 1974, cash receipts from livestock accounted for 52 percent of the total and crop receipts accounted for 48 percent.

5. Continued influence on crop and other farm prices from world crop production and other world economic conditions.

6. Issues that will affect agriculture.

   a. Inflation.

   b. Export policy on farm commodities.

   c. U. S. role in world food situation.

d. Emphasis by Congress and regulatory agencies in meeting the Clean Air and Clean Water Acts.

e. Decisions on pesticide regulations and uses.

f. Land use policy--national and state.

g. Tax policies--property, estate and inheritance, investment credit, tax shelters in agriculture.

h. Funds for agricultural research.

i. Transportation--improvement in roads, railroads and waterways.

7. Food complex.

a. Agriculture will be a focal point for the future.

b. The image of the farmer is at an all-time high. He will need to transfer this interest into "power" to solve problems.

C. New Directions

1. Increasing importance of capital in farm operations--size of operating expenses, cost of efficient size farms, confinement livestock operations, inflated costs of farm machinery.

2. Need to fully utilize crop residues to produce livestock.

3. More emphasis on management and marketing skills for farm operators without reducing technical production knowledge and skills.

4. Growing interest in basic marketing information and interpretation of this information--marketing information services (hotlines, newsletters, etc.).

5. There'll be a substantial changeover in agriculture in the next 5 to 10 years as those who started farming after World War II reach retirement age. One-third of Iowa farmers today are 55 years of age or older.

6. Question has been argued in the press, on media shows, by churches, in universities and colleges. Should the U. S. use food as a bartering tool in international affairs?

a. Question could never have been raised had not the U. S. had that food in abundance--produced by America's farmers. Rather bitter pill to raise the food and then haye opinions as to how it should be used downgraded in public print.

b. Other nations have few qualms in using their products as barter to gain products and economic assistance they require. As examples: oil, raw products, technically advanced machines, etc.

7. Agriculture is Iowa's basic industry--more than 76,000 jobs in Iowa are provided by the state's pork industry alone.

   a. We have within our borders 25% of all the Grade A land in the nation.

   b. Iowa is #1 in total farm population--in 1970, 544,000 farm residents. First time since records started (1910) that a non-South state led in farm population. 19.2% of the state population was on farms, according to 1970 census.

   c. Of Iowa's 36 million acres of land, 34.3 is in farms.

   d. 71% of the farms report having livestock, 47% reported marketing hogs, 26% reported marketing grain-fed cattle, 16% reported milk cows, 35% reported beef cows--1973 figures.

   e. 83% of the Iowa farms raised corn, 61% grew soybeans, 40% produced oats for grains.

   f. The Iowa Development Commission reported 50% of Iowa's manufacturing industry is agriculture-related.

8. Marketing.

   a. Recognition that dreams of $3 to $5 per bushel or cwt. are impractical.

   b. New marketing programs will be evolutionary rather than revolutionary.

   c. Information level for farmers is higher. They see cooperatives as solutions to marketing and procurement. Cooperatives are recognizing that loyalty without service is a myth.

9. Grain.

   a. Grain marketing channels will be watched with a cautious eye by farmers.

   b. The industry will have to establish its integrity prior to successfully establishing new services.

   c. Changing grade standards could have a marked influence on the marketing system.

10. Livestock.

   a. Animal health, cooperative marketing schemes, product merchandising promotion, supply, demand, transportation, government regulations, environmental problems, imports and exports will continue to be in the forefront.

   b. Livestock producers are accepting challenges to change this industry.

   c. Current influences, government, marketing agencies, farm organizations, will need to step up programs to keep pace with the producer and with the new image.

# Advances and New Directions in Technical Agriculture

Keith C. Barrons
Dow Chemical Corporation
Midland, Michigan

A look back is helpful when projecting the future. What factors have made American agriculture so productive? How was it possible to double average crop yields in the last four decades and make such remarkable advances in animal agriculture? We have tremendous land resources, of course, and abundant energy has been available. We have the infrastructure necessary for a high level of productivity and our farmers have had incentive.

But these positive factors existed before World War II when average corn yields were about one third what they are today. During this same period many other crops have increased by 50% to 100%. These improvements in crop productivity and many parallel advances in poultry, dairy and livestock production efficiency must be attributed to new technology. Of course we had some good agricultural technology before this yield revolution but it often had piecemeal application. Only when farmers put it all together with a systems approach did our technical agriculture research and development begin to pay off. It took:

a. improved cultivars and breeds.

b. better crop and poultry and livestock nutrition.

c. improved disease and pest control.

d. advances in husbandry and management practices.

e. control of physiology.

Now let's project these five aspects of agricultural technology. What new advances are at the threshold or on the horizon? Do they impact on agricultural education needs?

a. Genetic improvement of plants and animals.

In early times hereditary improvements came about merely by selection of natural variants. Then we learned how to induce variation by hybridization and

in recent years we have made wide use of hybrid vigor. These methods will continue to be important but now we are in a new age in plant and animal breeding. Asexual hybridization as a tool for making wide crosses, tissue culture of induced somatic mutations, production of haploid plants from pollen, apomixis, embryo implantation; these are some of the techniques modern plant and animal breeders are talking about. It is a highly specialized game. Tomorrow's teachers and tomorrow's farmers can hardly master this new "genetic engineering" technology, but they should be alert to developments that can further advance productivity.

b. Better nutrition.

Fundamentals are important. Wise decisions on levels of N, P and K to use on a given soil and with a given set of economics must be made by the producer. Only with a basic understanding can he do this and can he utilize new knowledge of minor element nutrition. Only with a good knowledge of soils and plants can he make the wisest decisions on new technology such as coated fertilizers, nitrification, inhibitors, and chelated minor elements. He may someday have new approaches to nitrogen fixation by non-leguminous crops.

Poultry nutrition may be predetermined by the specialist who formulates the feed but on-farm decisions will still be important with livestock, particularly cattle. New methods of improving the nutritive value of hay and silage and ways to better use waste products are important aspects of improved and more profitable livestock nutrition. At the very top of the list are new techniques for pasture and range improvement. Much research is underway on the industrial production of single cell proteins and these will someday be available as feedstuffs.

c. Superior pest and disease control.

The number of new drugs and pest control products made available for crop and livestock protection has been overwhelming during the past two decades. There is no aspect of farming today more important than being able to diagnose

a problem so an appropriate remedy or preventive can be chosen. Many new and often more specific materials are "on the drawing boards" and accurate identification of insects, diseases, and weeds will become even more important. New techniques of determining when pest control measures are really needed are under development.

Much research on control through better integration of chemicals with biological and cultural methods is underway. There is no way a producer of the future can take advantage of this new technology except through continuing study. After some basics related to pests, today's would-be farmer needs most of all to understand what his sources of reliable information are and how to use them.

d. New and better husbandry methods.

Crop and livestock husbandry involves more than bigger equipment and more efficient structures. True, much of our efforts in recent decades have been directed toward labor-saving methods, certainly important in our recent economy. But in the future, management for energy economy and for profits may be more important than further labor-saving machinery. Examples: improved ways to produce and store forages as already mentioned; minimum tillage and, on some soils, zero tillage to conserve soil and keep tractor costs down. Modified tillage and soil conservation practices will be of utmost importance to our national welfare and in the long run to the individual farmers too.

e. Physiology control.

The use of DES to improve growth rates in cattle is the best known example, but even though the use of this material may be terminated, research on modifying the physiology of animals and plants is going on at a rapid pace. There will be more growth promoters for poultry and livestock and many regulators for crops. Some are in use now; for increasing the flow of latex from rubber trees and the storage of sugar in the cane plant as well as a number of horticultural applications. I expect that someday we will have a growth regulator to inhibit

plant respiration and thereby increase the retention of fixed carbon. Significant increases in yield of crops like soybeans could result.

In conclusion we will see many advances in the technical aspects of agriculture, ones that can improve productivity and profitability if properly applied. The business-oriented farmer cannot have all this at his finger tips but if he has a grasp of the fundamentals and the know-how and inclination to keep up with a fast-moving agricultural technology, the world can be his.

# Trends, Problems, and Issues Ahead in World Food Production

Glenn W. Burton
USDA and University of Georgia
Tifton, Georgia

I. An Overview

A. Man has been a hunter-gatherer 99% of the time that he has been on earth.

1. Ate well of a great variety of foods

2. Worked less than 20 hours per week

3. World population during this period probably no more than 10 million (Lee and DeVore)

B. Population Explosion

| | Time | World Population |
|---|---|---|
| 1. | Beginning to 1830 | 1 billion |
| 2. | 1830 to 1930 | 2 billion |
| 3. | 1930 to 1960 | 3 billion |
| 4. | 1960 to 1975 | 4 billion |
| 5. | 1975 to 1985 | 5 billion |
| 6. | 1975 to 2010 | 8 billion |

C. An example of the problem

1. India had a stable population 1900-1920

a. Half of the babies died

2. Modern medicine saves the babies and the population increased 110 million form 1961 to 1971.

D. Population growth rate:

1. Developing countries increased from 2% per year in 1950 to 2.5% per year in 1970.

2. Developed countries declined to less than 1% per year today.

E. The developing nations with 70% of the world's people account for 86% of the world's population increase.

F. Different perspectives:

1. "In a world organized for the full use of technology and the proper sharing of effort, there would be no danger of running out of food either in this year or this century." (R. I. Jackson, FAO)

2. "In the real world in which we live, running out of food is a recurrent danger." (R. I. Jackson, FAO)

G. Food to Eat: The 4 billion in the world today have about 20% more food per person than the 2.7 billion people had 20 years ago.

II. Food Consumption

A. Grain consumption per capita:

1. USA

| | |
|---|---|
| a. Direct consumption | 120 pounds |
| b. Indirect thru meat | 1146 pounds |
| c. Total | 1266 pounds |

2. India

| | |
|---|---|
| a. Direct consumption | 400 pounds |
| b. Indirect thru meat | 0 pounds |
| c. Total | 400 pounds |

B. Affluence

1. Commands agricultural resources

2. Increases consumption of livestock products

3. Indirectly increases grain consumption

4. Increases food cost per capita

C. More than 2 out of 3 people in the world live in countries with average annual incomes of $ 200 per person or less.

D. Malnutrition is largely the result of poverty; Nation-wide poverty is largely the result of low productivity.

E. Inflation is causing more hunger and more malnutrition than lack of food per se.

F. The developed nations can not feed the world; about 90% of the world's food is eaten in the countries where it is produced.

III. Food Production

A. Total food production: 1954-1973

1. Developing countries expanded 75%

2. Developed countries expanded 65%

B. Food production per person: 1954-1973

1. Developing countries increased 8%

2. Developed countries increased 33%

C. Factors affecting food supply

1. Land

2. Seed, fertilizer, pesticides, etc.

3. Yield increasing technology

4. Weather and climate

5. Incentives

D. Climate

1. "Present day climate is much warmer than the average of the past several centuries"

2. "A return of the earth to cooler conditions is a realistic expectation over the long run."

3. "Advance knowledge of long-term future changes of climate is not yet available."

(Atmosperic Scientists)

E. Green revolution

1. High yielding varieties
2. Fertilizer
3. Improved management
4. Pesticides
5. Irrigation
6. Doubled wheat yields in Mexico in 10 years; quadrupled in 20.
7. By 1969 only 12% of the high yielding variety farmers followed all recommendations.

F. To produce more food per acre farmers need:

1. Higher yielding varieties
2. More fertilizer
3. Water control
4. Better cultural methods
5. Pest control
6. Multiple cropping systems
7. More know-how
8. Price incentives
9. Financial credit

G. Governments

1. Must insure inputs
2. Must provide incentives
3. Must provide credit

IV. Examples of Increased Production

A. Grass cereals

1. Supply 75% of man's energy

2. Supply over 50% of man's protein

3. But grass cereals lack protein and are usually deficient in one or more essential amino acids

B. All food constituents in cereals are under genetic control

1. Opaque-2 doubles lysine and trptophan content in corn

2. Floury-2 doubles lysine and increases methionine 50% in corn

3. 'Hyproly' confers high protein and high lysine in barley

C. K. J. Frey et al, Iowa State University transferred by intro-gression genes from wild oats to cultivated oats to:

1. Increase grain yields 25-30%

2. Improve grain protein content

3. Improve straw protein content

4. Raise grain oil content 12%

5. Give resistance to 5 diseases

D. Lancota hard red winter wheat:

1. Contains 10 to 20% more protein

2. Has high yield potential

3. Has good disease resistance

4. Has excellent milling qualities

5. Has excellent baking qualities

6. Could produce 100,000,000 lb. more protein per year in Nebraska

7. Bred by Johnson, Schmidt, Mattern, USDA-Nebr. cooperative effort

V. What Must Be Done:

A. Hungry nations must:

1. Plant more acres

2. Produce more food per acre

B. Hungry nations need

1. Better food storage

2. Better food distribution

C. Slogan popular in communist China: "Store food everywhere." (Chairman Mao)

D. The developed nations must continue to supply food to help avert famine due to droughts, floods, etc. But only to the hungry when acute shortages occur.

E. Food aid: The U.S.A. supplies 80% of all aid

1. $ 25 billion since 1954

2. It can only be temporary help

F. We help people most when we help them help themselves

G. Lowering agricultural trade barriers offers one of the best ways to enhance world food security.

H. "The technology to produce enough food for 4 billion more people in 25 to 30 years with present diets is not on the books." (ERS and FAS)

I. Either man limits population before it is conceived or famine will limit it afterwards.

# Significant Scientific Trends, Issues and Developments in America and in the World

Michael V. Nevitt
Deputy Laboratory Director, Research
Argonne National Laboratory

The views expressed here are those of a scientist who has spent most of his professional career at a National Laboratory, performing and directing basic research on materials--metals, ceramics, and liquids--in consonance with the interests of the U. S. Energy Research and Development Administration. As everyone knows, the USAEC, which was dissolved in January 1975, had as one of its most important goals the development of useful civilian applications of atomic energy, while the new agency, the U. S. Energy Research and Development Administration, has responsibility for the full range of civilian energy options--including solar, geothermal, nuclear and fossil systems.

It should be obvious at once that this presentation will probably not contribute much in a direct way to charting a future course in education associated with agriculture. In fact, the views expressed here could be regarded as narrow and parochial, considering the background and experience of the author. If there is value here, it lies in some thoughts on two broad future trends in science, as seen in a large energy research and development laboratory having many different scientific responsibilities. One trend is largely cultural (and therefore somewhat "non-scientific") and the other more traditional and analytical (and thus more "scientific"). Since no field of human endeavor has benefited more from science than agriculture, such considerations may be useful.

The two trends and the issues that follow from them can be stated easily--it is more difficult to treat their full dimensions, particularly in a short paper. They are:

1. Science will be engaged in an increasing number of cultural encounters with other segments of society and these encounters will influence the style and the role of science.

2. The traditional reductionist analysis approach in science--choosing simple problems and models with a small number of controllable variables--will share a partnership with an approach that deals with multivariable systems in an integrated way.

Neither of these trends is new or previously unexpressed. But each seems to be taking shape rapidly and each is likely to affect the science underlying energy and agriculture in a kindred and coupled way.

1. Cultural encounters and their influence on the style and role of science.

This is a fairly recent trend, offering a rather striking contrast to an earlier, dichotomous situation when science was a community apart, usually respected and occasionally feared by other parts of society but rarely communicated with in a real way and almost never challenged. But things are changing; scientists associated with nuclear energy (the technology rather than the science) can describe recent interchanges with activist groups that are better described as "confrontations" than as "encounters". Whatever they are called, they have been fractious, painful attempts at dialog between alien culture groups, communicating with each other in primitive and unsatisfying ways, which must be improved.

There are other events and institutional activities now taking shape, which are also part of this trend and which may provide more productive and influential kinds of cultural intercourse between science and other sectors of society, the public in particular. One of these is exemplified by the decisions of the U. S. Energy Research and Development Administration, the National Science Foundation and the National Institutes of Health to hold public hearings throughout the Nation to get input and advice on choosing scientific goals and programs and on selecting research proposals to implement the programs. ERDA has chosen two routes, holding some hearings on its own and also commissioning the National Academy of Sciences to include public hearings as an aid in structuring its study of nuclear energy and its alternatives.

While such actions have been stimulated by public pressures, they are also a clear manifestation of a desire on the part of the science community and science sponsors to develop a better rapport with other cultural and societal elements. The role and style of science will undoubtedly be influenced. It is likely that in time a new arm of scientific effort will develop as a bridging function to other cultural elements: a new body of public-policy science will emerge, and a new component of scientific literature will probably take shape, speaking at once to the public and to the science community. Whether science as we know it will be "diluted" or "enriched" by these new elements is sure to be debated.

2. The treatment of complex, multivariable problems as a complement to the traditional scientific approach.

In a way, this trend is related to the preceding one. Clearly, science's inablilty--or unwillingness--to deal with complexity has inhibited its intercourse with other parts of our culture.

Researchers in the agricultural sciences may find the trend statement naive. Agriculture scientists have per force dealt with many variables, not under uniform control, and have found statistical methods and models to cope with such experimental situations. The physical scientist, doing bench-top or even large-machine research, has luxuriated, so to speak, in his ability to control with much more certaintly a much smaller number of variables. But now, physical scientists involved in research dealing with energy and its technological, economic, environmental and social options and trade-offs are experiencing the difficulties that arise from the compartmentalization that their traditional approach has engendered.

In energy research and development, "everything is related to everything else." A complex model describing the total interplay of energy, materials and human needs is the only one that is valid and sufficiently comprehensive for energy-related science. Subsystems of this model will be the essential matrices

in formulating scientific expression.

Fortunately, science can tap technology for assistance, demonstrating once again that the flux of information from basic to applied science can be of either sign. The discipline of systems analysis and its essential partner the high speed digital computer will permit the scientist to deal--with confidence if not enthusiasm--with problems and models of high complexity. Only an adverse attitude on the part of the scientist himself can slow this trend.

Will these two trends, if they are valid and enduring, generate evolutionary or revolutionary changes in science? There is no clear answer. Revolution usually arises from an internal crisis rather than from external forces. The science community is not entirely complacent at present, but neither is it crisis-oriented. Simplistically, then, evolution should be expected. Such an evolution should hopefully occur at a measured pace, retaining the validated traditional scientific foundations while developing more productive interactions with other elements of our culture.

# AGRICULTURE AND YOUTH IN THE YEAR 2000:
# DEVELOPMENTAL NEEDS OF SECONDARY AND POST-SECONDARY YOUTH

Robert J. Havighurst
University of Chicago

According to the conventional wisdom young people take a major solid step into adult identity by getting and holding a stable job. There are almost no other alternatives for boys, and girls are more and more achieving their initial adult identity through a job rather than through marriage.

If at any period in history boys in their late teens or early twenties have difficulty finding jobs, this is generally taken as a serious social and personal problem, predictive of alienation, or political disturbances, and also of delinquency.

Since the numbers of young people reaching the age of 18 reached 4 million for the first time in 1972 and will continue at this high level until 1979 after which there will be a rather sharp drop, it was to be expected that they might experience more difficulty getting into the adult labor force than their older siblings who reached their twenties during the 1960's, when they were in smaller age cohorts.

This situation was worsened by the severe economic recession which came soon after 1972. The result is that in 1975-76 we have the highest rates of youth unemployment since the Depression decade of the 1930's, and possibly the current level of youth unemployment is greater than it was in the mid-1930's.

The Demographic Situation. The relevant population facts are shown in Table A. Even in the best of economic conditions, the United States would have a problem of youth unemployment during the 1970's, due to the temporary very large birth cohorts of the 1950's. In 1975 we have 41 million young people between the ages of 15 and 24, compared with only 22 million in 1960. This group is about twice as large as the group 55-65 who are moving out of the labor force during this

decade. In 1980 the situation will be equally difficult, with 41 million in the 15-24 age group. After that, this age group will decrease in size, due to the relatively low birth rates since 1965. Thus the youth unemployment problem is critical for the next ten years, and may require temporary measures for this emergency period. Table A shows that the ratio of the 15-24 age group to the 25-64 age group is about 50 percent higher for the period from 1970 to 1980 than it was in 1960.

The unemployment figures for young people have received less public attention recently than the unemployment levels of the 25-64 group, the men and women who have major responsibility for family support. However, the "official" unemployment data published by the Bureau of Labor Statistics, state that the unemployment rate of youth (defined as the 16-19 year age group) is three times as high as the rate for the total labor force. Furthermore, the actual unemployment rate of young people may be over-estimated or under-estimated by the BLS statistics because so many young people seek work only in the summer, and they spend a considerable amount of time looking for work, which marks them as "unemployed" at those times. On the other hand, many young people (and older ones as well) simply give up the search for work because they are convinced that it is useless to try to find a job. They do not register at an Employment Service office and therefore are not counted as "unemployed." In any case, the BLS figures for 1973 showed the "unemployed" 16-19 year olds to be 30 percent of the total unemployed group of all ages.

While the crisis is most alarming in the slums of the big cities where people are the principal victims of poverty and unemployment, as well as transgressors in the crime statistics, it is also present, perhaps in a more enduring form, in the villages and the rural areas, where agriculture and agriculture-serving business are the main economic base. Table 1 gives the number of 12-year-olds, as of 1960 and of 1970, and their distribution between urban and rural areas. In 1970, twenty-six percent of 12-year-old children lived on farms or in

villages with less than 1000 population. Table 2 gives data on the occupations of males, age 16 and over, in 1970. The farm occupations absorbed 4.5 percent of the male workers, while 29 percent of boys in the country were growing up in rural areas. It is common knowledge that the proportions of farmers and farm workers in the male labor force have decreased as shown here:

| | 1910 | 1930 | 1950 | 1960 | 1970 |
|---|---|---|---|---|---|
| Percent of farmers and farm workers in labor force | 35 | 25 | 15 | 10 | 5 |

Educational Objectives for Youth

This gloomy picture of the crisis for youth would leave most of us convinced that the best place for young people in this situation is not the big city, and perhaps no the village, but the small city and the suburb of the large city. Still, these young people are pretty much penned up in high schools and colleges, with little chance to experience much of the real world. As the Coleman Panel on Youth observed, in their 1974 Report on Youth: Transition to Adulthood, the objectives of a modern democratic society for the growth of young people between the ages of 15 and 24 should be the following.

Objectives of Self-Development

1. Cognitive and noncognitive skills necessary for economic independence and for occupational competence. We refer here not only to verbal and mathematical skills, but also to a variety of social skills and of manual and technical skills to fit the wide range of contemporary occupations.

2. Capability for effective management of one's own affairs. Self-direction and self-management are essential in a complex world.

3. Capability to engage in intense concentrated involvement in an activity. Great accomplishments and small ones alike are personally satisfying when they grow out of "inner motivation which propels the person and focuses his or her attention."

4. Capabilities as a consumer, not only of goods, but more significantly of the cultural riches of civilization. Enrichment of the entire adult life flows from the development of taste and understanding of art, literature, music, and history.

Objectives of Social Relations

A range of types of involvement with other people is needed for the social maturation of youth.

5. Experience with persons differing in social class, subculture, and in age. For a society which is committing itself to a democratic culture pluralism, as ours is doing, it is essential that young people expand their social and moral horizon to include a concern for people with a diversity of life-styles.

6. Experience of having others dependent on one's actions. Full adult responsibility as a spouse, parent, and citizen requires caring for others who need assistance.

7. Experience of interdependent activities directed toward collective goals. A healthy society requires cooperation and coordination of the activities of many people. The young person needs experience in the roles of leader and of follower.

It must be clear to all of us that most young people today have less opportunity than they had a generation ago to achieve these objectives. The age-segregated high school and college needs to be supplemented by other forms of maturity-building experience.

The Next 25 Years for Small Town and Rural Youth

It appears to this writer that the youth of rural America may be in an unusually favorable situation to get the kind of growth-promoting experiences that they will need, even though only a minority of them may look forward to living on the family farm or in the rural community as it now functions.

The reason for this is that the technology of the American economy seems to be in for some major transformations which grew out of what we are now calling the "energy crisis." In Table 4 we see some carefully-studied data on energy production and consumption. The oil reserves of the planet will be exhausted by the year 2010, if they are consumed at the 1972 rate; and if they are used to maintain a world industry growing at the rate of 5 percent a year, they will be gone by 1993. Coal reserves are very large, and might last for 200 years. But the cost of gathering and using low-grade coal as a major energy source will raise the cost of energy so much that other sources of energy will be sought. A government commission, reporting in 1972, predicts that the United States and the rest of the world will turn to nuclear energy as the principal source shortly after 2000.

Only recently, with a growing interest, has the U. S. government and the energy industry turned to the one source of natural energy that is inexhaustible for the foreseeable future--the daily flow of energy from the sun to the earth. There is a growing literature which takes the possibilities in solar energy seriously. Congress passed the Solar Energy Research, Development and Demonstration Act in 1974.

Most of this energy is immediately lost to use by man for his immediate needs. It raises the temperature of the earth's surface which cools off at night; it produces air currents, some of which are used by windmills; and it produces vegetation, some of which is immediately used by man for food and fiber, and some of which collects to become the base for fossil fuels of the far-distant future.

But the collection and use of solar energy by man is now under way on a growing scale, and is perhaps the enduring solution of the energy problem. A variety of machines for collecting and converting solar energy are now in use, mainly for home-use. For example, Israel and the Arabian cities get hot water for domestic purposes from solar machines on roof-tops. And such machines can be used to drive electric generators.

Mesarovic and Pestel (Ch. 10) place reliance on solar energy as the resource for the future. They speak of covering up to one percent of the earth's surface with "solar energy farms," at a cost between $20,000 and $50,000 billion, with annual output of energy equivalent to about 200 billion barrels of oil. Since the energy would have to be transported to the places where it could be used, this would be done partly by high-tension electric cables, but mainly by electrolyzing water to produce hydrogen gas. All this will require research and development.

Solar energy may be collected and converted by man-made machines, but a similar process goes on all the time in nature, through photosynthesis of plant life. The special issue of the journal Science for May, 1975, devoted to Food contains the following statement by J. J. Horsfall, Chairman of the National Academy of

Sciences Committee on Agricultural Production Efficiency: "It is the business of agriculture to collar and store solar energy as food energy in plant and animal products." Various plants have various efficiencies of photosynthesis. One of the more efficient ones is corn (maize) which ranks third in world production as a food crop. The corn plant produces grain and the plant itself, which can be used for food or fertilizer or for direct energy production.

David Pimental and colleagues have studied corn as a source of energy. They measured the "energy inputs" on a one-acre field of corn in units of a thousand calories (kilocalories). The man-introduced energy (through machines, gasoline, labor, fertilizers, transportation, etc.) totaled in 1970 to 2.9 million kilocalories, and produced an amount of corn with an energy value of 8.16 million kilocalories, or an output/input ratio of 2.82. Thus the corn crop returned 3 times as much energy as the growers put into it. Two thirds of the energy output was provided by the sun. This is a favorable ratio, but the energy in the corn output from an acre of land producing 100 bushels per acre represents only 0.4 percent of the solar energy that strikes a one-acre field during the growing season. Adding the energy value of the corn plant, one finds that 1.26 percent of the solar energy is turned into the energy in the cornplant and its grain.

This may appear to be a low efficiency, but it is not bettered very much by the most efficient of contemporary solar energy machines. Brinkworth reports that the maximum efficiency of conversion of solar energy into usable energy, to date, is but 2 percent. Zeltich, in the Special Issue of Science on Food, reports on studies aimed at "Improving the Effieciency of Photosynthesis." The process of photosynthesis combines water with carbon dioxide from the atmosphere to produce carbohydrates (plant body plus grain) which can be used as food, or as sources of energy through production of methane and alcohol. Some plants are much more efficient users and converters of solar energy than others. There is every reason to expect that research will raise the efficiency of the use of solar energy through agriculture. But one basic fact comes through in all the studies of energy sources.

They all cost more in terms of human labor input than did the exploitation of petroleum production under the conditions of 1925-75.

Significance for Secondary School and College Level Education

It is inevitable that the curriculum of general education for ages 12 to 20 will be deeply permeated by study of the civic and technical spects of energy production, utilization, and conservation. National elections will probably turn more and more on policies of the political parties for energy.

Young people in the rural areas of the country will be more and more involved in the technology and the politics of energy production and use.

As the economy turns more and more to coal, and especially to low-grade coal which is widely dispersed in areas of sparse population, the coal industry will become more and more closely linked to a rural population.

If the economy turns to a much greater reliance on photosynthesis for the production of energy, farmers will breed the most efficient enery-producing plants, and will cultivate them vigorously. Vocational agriculture will specialize more and more on teaching how to grow crops that are most efficient energy producers.

On the arid lands, which generally have a maximum exposure to direct sunlight, a new kind of "energy farm" will probably develop, consisting of energy collecting machines that cover every available square foot of land. The Winston Compound Parabolic Collector may become the major device for efficient energy collection. These machines will need tending, and the machines that utilize the solar heat to produce electrical energy will need tending. One can visualize the vocational agriculture courses in schools and colleges of Texas, Arizona, New Mexico, Utah, Nevada, and the Dakotas, carried on in schools of agricultural engineering, and in high schools that prepare students for the colleges, as well as for operating family energy farms.

Let us be clear, now, that this image of the future is a real one, if the actual cost of energy production is as low or lower than the cost of energy from the atomic nucleus. We may be sure that the federal government as well as private

industry will devote a great deal of money to research on energy resources, both nuclear and solar, during the next 25 years.

Nuclear energy has a more clouded future than solar energy, for two principal reasons. The two sources of nuclear energy that are conceptually possible are:

1. The breeder reactor that uses uranium and plutonium to produce energy from heavy elements and at the same time produces dangerous by-products together with an enormous amount of waste heat. This method is now being developed with heavy capital investment from the major utility companies. It requires a large capital outlay, and is dangerous, both in its technology and its political implications.

2. The fusion of light elements (protons and neutrons) into such light and harmless atoms as helium, with consequent production of energy. This requires temperature intensity such as that of the sun's surface, or a high intensity of magnetic field, which has not yet been produced on a practical scale on the earth. If the problem is solved in a way that produces cheap energy, the future will be cared for. But few experts believe we will have commercially available energy from nuclear fusion by the year 2000.

Meanwhile, the solar energy is here, every day, only a fraction of one percent of it being utilized by humans for their present needs.

It will be important for this conference to get a clear conception of the energy resource problem over the next 50 years, from the physical scientists.

## REFERENCES

Brinkworth, B. J., Solar Energy for Man, Salisbury, Wilts, England: Compton Press, 1972.

Commission on Population Growth and the American Future, Vol. 3. Population, Resources, and the Environment. Washington, D.C., U.S. Govt. Printing Office, 1972.

Havighurst, Robert J. and Philip Dreyer, eds. YOUTH. Yearbook of the National Society for the Study of Education, Chicago: University of Chicago Press, 1975.

Mesarovic, Mihajlo and Eduard Pestel, Mankind at the Turning Point. New York: Dutton, 1974. London: Hutchinson, 1975.

Pimental, David, et al., "Food Production and the Energy Crisis." Science, 182: 443-449, Nov. 2, 1973.

Science, May 9, 1975. Special Issue on Food.

Zeltich, Israel, "Improving the Efficiency of Photosynthesis." Science 188, 626-633, May 9, 1975.

Table A

DEMOGRAPHY OF YOUTH, 1950-2025

| Year | 1950 | 1960 | 1970 | 1980 | 1990 | 2000 | 2025 |
|---|---|---|---|---|---|---|---|
| Age 15-24 (million) | 22.2 | 24.1 | 36.4 | 40.7 | 37.5 | 40.7 | 41.9 |
| Percent of total | 14.6 | 13.4 | 17.8 | 18.1 | 16.7 | 15.4 | 13.9 |
| 15-24/25-64 | .29 | .29 | .41 | .40 | .32 | .32 | .28 |

Assumptions: Fertility at replacement level from 1980.

Immigration, 400,000 per year.

Havighurst

Table 1. U.S. POPULATION, 12 YEARS OLD. 1960 and 1970.

| | Total Population: Age 12 (Thousands) | | Percentage Distribution | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Urban | | Rural | | | |
| | | | | | 1000-2500 | | Farm & Below 1000 | |
| | 1960 | 1970 | 1960 | 1970 | 1960 | 1970 | 1960 | 1970 |
| Both Sexes | 3,574 | 4,183 | 66 | 71 | 4 | 3 | 30 | 26 |
| Male | 1,818 | 2,133 | 66 | 71 | 3 | 3 | 31 | 26 |
| Female | 1,756 | 2,050 | 66 | 71 | 3 | 3 | 31 | 26 |

Table 2. OCCUPATION OF MALES, AGE 16 AND OVER. 1970.
(Thousands)

| Age | 16+ | 16-17 | 18-19 | 20-24 | 25-29 | Median Age |
|---|---|---|---|---|---|---|
| Total Male | 47,623 | 1,223 | 1,721 | 4,984 | 5,649 | 40.2 |
| Farm Occupations | | | | | | |
| Farmers & Mgrs. | 1,348 | 4.5 | 8.6 | 46.4 | 76.2 | 50.8 |
| Laborers & Foremen | 795 | 82.2 | 70.3 | 100.0 | 70.6 | 36.4 |
| Paid | 736 | 65.7 | 38.2 | 90.2 | 67.4 | 37.7 |
| Unpaid Family Workers | 59 | 16.5 | 12.1 | 9.8 | 3.2 | 20.4 |
| | | | Percentages | | | |
| Total Male | 100 | 100 | 100 | 100 | 100 | |
| Farm Occupations | 4.5 | 7.1 | 4.6 | 2.9 | 2.6 | |
| Farmers & Mgrs. | 2.8 | 0.4 | 0.5 | 0.9 | 1.4 | |
| Laborers& Foremen | 1.7 | 6.7 | 4.1 | 2.0 | 1.3 | |
| Paid | 1.6 | 5.4 | 3.4 | 1.8 | 1.2 | |
| Unpaid Farm Workers | 0.1 | 1.3 | 0.7 | 0.2 | 0.1 | |

Havighurst

Table 3. ENROLLMENT IN FEDERALLY AIDED VOCATIONAL CLASSES, COMPARED WITH TOTAL ENROLLMENT IN GRADES 7-12.

PUBLIC SECONDARY SCHOOLS

| Year | 1948-49 | | 1960-61 | | 1970-71 | | 1973-74 | |
|---|---|---|---|---|---|---|---|---|
| | | % | | % | | % | | % |
| Total Enrollment Grades 7-12 (Thousands) | 6908 | 100 | 11,733 | 100 | 17,500 | 100 | 18,400 | 100 |
| Agriculture | 373 | 5.4 | 508 | 4.3 | 370 | 2.1 | 380 | 2.1 |
| Home Economics | 800 | 11.6 | 1,100 | 9.4 | 1,934 | 11.0 | 2,687 | 14.6 |
| Voc. Trade & Industrial Education | 370 | 5.4 | 345 | 2.9 | 450 | 2.6 | 500 | 2.7 |

Source: U.S. Office of Education: Digest of Educational Statistics, 1974. Tables 47 and 48 and 49. Adapted.

Note: Listening Panel members commented that the above figures to not include those students enrolled in off-farm agricultural taxonomies as created by the 1963 Vocational Education Act, and Dr. Havighurst agreed that the data as presented by the Digest of Educational Statistics was confusing. However, since there was no available copy of the Digest, the project staff could not verify the data as stated above.

Table 4. OIL AND COAL RESERVES

| Region | Oil Reserves | Future | | Coal Reserves | Future | |
|---|---|---|---|---|---|---|
| | Percent of Proven Reserves | Years of Production 1972 Rate | Growth of 5% a year | Percent of Known World Reserves | Years of Production 1972 Rate | Growth of 2% a year |
| North America | 7.1 | 12 | 9 | 16.5 | 1237 | 164 |
| Western Europe | 1.9 | 80 | 33 | 1.7 | 184 | 78 |
| Japan | 0.0 | 4 | 4 | 0.2 | 253 | 91 |
| Australia | 0.3 | 15 | 11 | 1.7 | 652 | 131 |
| Eastern Europe | 11.8 | 26 | 17 | 59.1 | 2993 | 207 |
| Latin America | 4.9 | 19 | 14 | 0.3 | 1214 | 163 |
| Middle East | 65.8 | 58 | 28 | 0.0 | 75 | 46 |
| Main Africa | 3.4 | 30 | 19 | 0.2 | 1555 | 175 |
| South Asia | 1.9 | 23 | 16 | 1.3 | 646 | 133 |
| China | 2.9 | 105 | 38 | 18.9 | 1998 | 187 |
| World | 100 | 37 | 21 | 100 | 1725 | 180 |

Source: Oil and Gas Journal, December 25, 1972. Proceedings of the World Power Conference, 1968.

ENERGY CONSUMPTION: UNITED STATES AND THE WORLD

| | United States | | | Rest of World | | |
|---|---|---|---|---|---|---|
| | Percent of total | | | Percent of total | | |
| Type of Energy | 1968 | 1980 | 2000 | 1968 | 1980 | 2000 |
| Coal | 21.3 | 18.8 | 13.8 | 39.9 | 20.4 | 11.5 |
| Oil | 43.3 | 39.2 | 31.4 | 42.7 | 52.3 | 47.8 |
| Natural Gas | 31.3 | 28.7 | 24.8 | 9.6 | 16.0 | 16.0 |
| Hydro | 3.8 | 3.3 | 2.9 | 7.4 | 6.6 | 6.0 |
| Nuclear | 0.2 | 10.0 | 27.1 | 0.3 | 4.7 | 18.7 |
| Total Quadrillion BTU | 62.4 | 95.1 | 190.0 | 127.3 | 249.5 | 641.2 |
| United States Percent of World Consumption | 33 | 28 | 33 | | | |

Source: Commission on Population Growth and the American Future, Vol. 3. Population, Resources, and the Environment, Ch. 5.

# CHANGING PATTERNS IN VOCATIONAL DECISION MAKING

H. B. Gelatt
American Institute of Research
Palo Alto, California

The process of making vocational and career decisions appears to be deceptively simple. It starts with the universal question: "What do you want to be when you grow up?", and ends with the 25 year watch when retiring from the company.

However--which persons manage to end up in which jobs--is the result of a long, complicated series of decisions based upon many factors and events occurring throughout the course of one's lifetime.

In order to explain (and predict) this complicated series of decisions and events, theory builders have constructed elaborate and elegant concepts, phrases, and models. The fact that these decisions and events are almost impossible to explain (let alone predict) has not dissuaded the theory builders.

Not only is the complicated process of vocational and career decision making being analyzed, described and predicted, it is also being taught! Career education is a relatively young movement, but it is viewed with great initial enthusiasm in this country.

The enthusiasm comes from the faith that this new career education can deliver all that it promises. And yet, several years and several million dollars later, we are still required to accept career education on the basis of our faith in the movement.

In spite of the difficulty of defining and analyzing individual career choice and in spite of the lack of evidence of results from education in career choice, there are some trends, developments, and future concerns in this area which should be considered when establishing philosophic principles and designing program objectives for public education at secondary-post secondary levels. My summary of these is outlined below.

I. Philosophical Considerations

A. Should public education provide training or interventions to influence or improve individual's vocational and career decision making?

1. In unplanned, unpredicted, uncontrollable events are the predominant determiners of career choice, education may have little effect.

2. If interventions are desirable and feasible, on the basis of what values should they be made?

3. Should interventions be direct (teach people) or indirect (change environment).

4. Should you teach students what to decide or how to decide?

B. What model of career development should be utilized to design educational principles, objectives and curriculum?

1. Do people choose their vocation by a rational process of deciding? Which one?

2. Is career choice purely intuitive?

3. Is it fortuitous, accidental? Do most people use a fatalistic design strategy?

C. What are some current unresolved issues?

1. Will productive work continue to be a value in our society?

2. Is secondary and post-secondary school too late to provide education in career decision making?

3. Do minority groups need a special kind of career education program? A special theory of career development?

4. Are tests likely to be more hurtful than helpful in assisting career decisions?

5. Is the goal of meaningful, satisfying work for every individual realistic? Desirable?

6. Do the problems of career decision making lie in the economic system rather than in the educational system?

II. Developments and Trends

A. Identified factors influencing career decision making

1. Genetic endowment and special abilities
2. Environmental conditions and events
3. Learning experiences
4. Task approach skills--the result of yet unexplained interactions between learning experiences, genetic factors and environmental conditions.

B. Major problems associated with individual career choice

1. Conflict in values (and/or lack of clear values)
2. Insufficient information (or too much information to process)
3. Uncertainty of outcomes

C. Changes in decision making today

1. The old, safe, convenient reasons for deciding are all but gone:
   a. because of Revelation, Holy Scripture
   b. because it's right, "I should"
   c. because it's tradition, "Everyone does it"
   d. because of my experience
2. We now have a society of pluralistic values
   a. value clarification is more necessary
   b. value construction is more possible
   c. value conflict is more likely
3. Our culture has changed from experience rich-information poor to information rich-experience poor.
   a. decision makers need to learn how to process the rich information available
   b. gaining personal experience and utilizing others' experience is another need
   c. education continues to teach is if its clients were experience rich-information poor

4. There is growing shift away from the worship of rationality
   a. does each action or choice require a prior purpose or objective?
   b. is intuition real?
   c. could human choice behavior be as much a process for discovering goals as for acting on them?

D. Possible trends in the future of vocational and career choices
   1. Increasingly students will be taught general skills of decision making in elementary and secondary schools.
   2. College and adult education courses will continue to be popular in career and personal decision making.
   3. The issue of values indoctrination vs. values education will confront educators.
   4. The cost-benefit ratio of career selection may take on a very different look.
   5. Strategies, techniques and scientific methods will be taught and utilized for predicting possible futures.
   6. "Vocational guidance" may be more in the form of major institutional changes, major social reforms, and new legislation than in individual counseling or public education.
   7. Testing, as a movement in career placement and selection will continue to face strong criticism.
   8. The rapid and efficient processing of information will have its effect on how and why personal decisions are made.
   9. Leisure, life style, avocation, etc. will grow beyond its current reciprocal relation to occupation.
   10. The debates of free will vs. determinism, autonomous man vs. a conditioning society will be renewed.
   11. The results of civil rights and minority movements will change the nature of certain occupations.

12. Career innovations such as job sharing, etc. will continue to grow.
13. As is always true, many new occupations will exist by the time current students enter the job market.
14. There may be a return to "the good old days" in regard to the preferred occupations.

# NEW MORALITIES AND OLD: A RECONSIDERATION *

Dr. Paul Holmer
Yale Divinity School
New Haven, Conneticut

I. Now in a period of moral questions

   A. Confusion abounds

   B. Skepticism has grown greatly

II. General reflections about moral issues

   A. New moral spirit has been created in our presence

      1. Creation of a wide-spread "Moral Consciousness"

      2. Looks as if large numbers of people have been morally sensitized

   B. An easy kind of moralism has developed, partly in cause of vulgarism, and partly in consequence of a popular pedagogy

      1. A notion has been created that everyone should become cognizant with quasi-moaral factors which permeate our society

      2. Also, there is widespread enthusiasm for teaching everyone who he is; i.e. self-identity

         (a) A sign of morality is that everybody speaks out on his particular interests

         (b) In consequence we have had interest groups speaking "like mad". The result being that on any public issue we have had, if not an educated, at least a "gabby" group.

         (c) Pop culture has been so rich in easy assimilation of all this to moral notions, that anyone who does the above is credited, almost in advance, with being morally serious, sensitive, and earnest.

* Summary outline as it appears here was prepared by Project Staff from the taped presentation.

III. New morality seems to be a widespread proclivity to think that being moral is a matter of adopting a policy; and policy considerations for groups, for nations, for professions, and usually larger constituencies.

A. Having a defensible public policy of whatever sort is a popular moral posture into which people move without crisis or personal turmoil

B. Morality in our day is cheap -- you get it by exposure

C. There is a tendancy to be preoccupied with questions of public policy, and having nothing less than a general, critical attitude toward everything, with a high sensitivity and suspicion of authority

1. This passes for being moral
2. Causes for the above:

(a) Government and legislation has been used to change or modify "wretched" social arrangements

(b) The notion has developed that the life of learning can arm us with a capacity to change. It has been further developed that change is not only contemplative, but also activistic, and can be an instrument for productivity.

(c) That is, learning with legislation tends to create a sense of restlessness; a sense that we must do something with learning; this implies that we must have policy to regulate and order life.

D. Creation of "New Morality" is the moral temper in which the creating and sustaining of an interest, augmented in the direction of a policy, looks like the heart and substance of being moral. Many kinds of groups, people, and circumstances profess to this.

E. Consequence of New Morality:

1. It makes criticism easy and plausible, and unleashes countless critical demeanors
2. If we agree that the formulation of a moral policy is accomplished by gaining a kind of consensus of interest groups -- and if that is the way that a person's morality is going to come -- then the difficulty is getting a consensus of interest

groups.

(a) Results in widespread disagreement that further results in a new kind of skepticism

(b) Also, people begin to settle for a picture of human life that is terribly "average".

IV. Old moralities (e.g. of Christian and Jewish traditions, Socrates, Aristotle, and Plato) have always said something else.

A. The "Old Morality" has said that it is a kind of morality which does not always lead to a clear-cut consensus; But rather, it says that the big task of morality is not to produce policy and policy statements, but rather to cultivate people who can cope with a huge range of circumstances.

Old morality's purpose was to create people -- who would be virtuous, courageous, just, temperate, kind, resolute, and eventually who would be so content and at peace, that they might be called happy -- even when faced with great obstacles and/or injustices.

B. Notion that morality consists in relieving all suffering is one of the illusions of the twentieth century.

C. The old morality was always not identified with science and legislation, but identified with the deep, personal culture and also with the humanistic tradition.

1. The aim of humanities was to make a person continually capable of wonder, having a zest for life, a feel for marvels, and a capacity for admiration.

2. Old morality would make one capable of overcoming fickleness, cruelties, and inabilities to cope.

D. Obviously, we still need policies, but Socrates had it correct when he stated that ethics produced character, and that questions of policy were finally matters of politics.

# LABOR TRENDS AND NEEDS OF SOCIETY DURING THE NEXT DECADES

Rupert Evans
Bureau of Educational Research
University of Illinois

Decreases in birthrate means fewer youth to educate. Elementary schools are being shut down all over the country. Elementary teachers are unemployed.

The next to be affected will be high schools. Inevitably this will mean high school closings and consolidations, and fewer jobs for high school teachers. 1974 was the peak year for high school enrollments. From now through the late 1980's high school enrollments will go downhill.

Teachers in other fields are even more concerned about the figures on changed birth rates. Teacher unions have begun to lobby against funds for teachers colleges in an attempt to slow down the flow of new teachers who will compete for new jobs.

But as vocational teachers we must be concerned about another kind of effect of changed birth rates: we must be concerned with their effects on the labor market. For more than forty years this country has had the highest rate of youth unemployment of any industrialized nation. Since 1960 this rate has gone up particularly sharply until the current rate is almost 20%. For young female blacks the rate is over 40%. By any standards these rates are intolerable. On the other hand, it is a wonder that they are not higher.

Youth between ages 18 and 21 have the highest rates of unemployment among those seeking full-time work. In 1960 there were less than 10 million youth between ages 18 and 21. In 1978 this group will peak, and there will be 16.6 million people in this age range. Assuming that the 20% unemployment rate continues to hold in 1978, 3.3 million will be unemployed. But if we had created no new jobs for youth between 1960 and today, the youth unemployment rate would be far over 50%. Somehow we have adjusted reasonably well to the situation of having almost 7 million more youth aged 18-21 in 1975 as compared with 1960.

But what about the future? By 1987 the population aged 18-21 will drop to 13.8 million. This means not only fewer students in high schools between now and 1984, but it also means 4 million less 18-21 year olds seeking jobs in the mid-1980's than now. Even if we do not create any additional jobs during the next ten years, we are going to be faced for the first time in this century with a shortage of youth in the labor force. What does this mean for vocational educators?

One way of assessing this problem is to look at what has happened in other countries which have faced shortages of young workers. Japan and Germany are perhaps our best examples. Both had low birth rates after W. W. II. Both had rapid expansions of employment during the 1960's. Both have had extreme shortages of young workers.

Germany imported young workers from Southern Europe. Japan did not import young workers. Both found that many tasks formerly done by young workers were no longer being done. In Japan today, a young worker is known universally as a "golden egg," a valuable, desirable commodity for any community or employer. The attitude of Japanese society toward youth has changed markedly, and I suspect that the attitudes of youth about their own worth have changed as well. Youth in Japan are optimistic and sure of themselves.

Similarly in Germany, German youth are self-assured. They know that if employment declines, the youth from Southern Europe will be sent home and German youth will still be needed by society.

Both Japan and Germany have expanded vocational education rapidly. When youth are scarce one cannot afford to have them unproductive.

What will happen here as we face shortages of young workers during the 1980's? The most likely possibility is that we will do as the Germans have done, and import young workers from Latin America. If so, we will need vocational instructors who are competent in Spanish, Creole, Portuguese and French languages and cultures.

Regardless of whether we follow the German or the Japanese model, or a model of our own, we are likely to see a confident U.S. youth labor force disdaining low paid menial work and seeking vocational skills which will lead to higher paid production and service jobs. Industry will demand effective vocational education for handicapped and disadvantaged youth and will be glad to employ them. Vocational education for young adults and retraining for older adults will get high priority.

But agricultural teachers are also concerned with young farmers. What about the age group 25-39, which has been a bulwark of American productivity and stability? One reason these people have been productive is that they have had low unemployment. In turn this has been covered by their slow expansion in numbers. In the 1950's the age group increased in size by only 500,000. In the 1960's it increased by only 700,000. But in the 1970's it will increase by 15,000,000. There will be plenty of people who want to be young farmers, but there won't be enough farms.

Vocational educators will have jobs in spite of the definite decline in secondary school enrollments and the probably decline in post-secondary school size. But accountability for vocational educators is likely to increase.

If employers badly need all of your dropouts and graduates, they will be concerned about how well you teach all of your students, not just the cream of the crop. And agricultural teachers in those high schools which are already too small can expect no immediate relief from pressures to fire teachers and consolidate high schools to adjust the dwindling enrollments. The soonest that relief can come is 1990, and it may not come then if family size continues to shrink.

Area, secondary and post-secondary schools appear to be the only solution to provide necessary economics of scale. This, in turn, means that the day of the one-teacher agricultural department is nearly gone, to be replaced by agricultural teacher specialization, and a need to learn how to compete with and cooperate with teachers from other vocational fields.

# Economic Trends, Issues, and New Directions in America

Dennis R. Starleaf
Department of Economics
Iowa State University

## Inflation prognosis

The rate of inflation has been declining in the United States for the last year or so. This downswing in the rate of inflation will likely continue for at least another year and a half. If the United States does not become involved in a major military conflict, I think that it is likely that the rate of aggregate price rise will average less than four percent per year over the next ten to fifteen years.

Excessively stimulating Federal monetary and fiscal policies were the fundamental causes of the rapid rate of inflation which we have experienced in the past several years. (However, special factors such as poor world food harvest in 1972-73 and the formation of the OPEC oil cartel were also important.) The reason that our inflation rate is now declining is that monetary and fiscal policies have become less stimulating. The reason for my belief that the rate of inflation will be relatively modest over the next decade and a half is that, barring our involvement in a military conflict, Federal policy makers are not likely to return to excessively stimulating policies.

## Unemployment prognosis

The unemployment rate has been declining in the United States for the last eight or nine months. The downward movement in the unemployment rate will undoubtedly continue for the next two or three years. However, I doubt very much that the unemployment rate will fall below five percent within the next decade and a half; it will probably average about five and a half percent of the labor force.

Given the current composition of the U. S. labor force, there are probably about as many people looking for jobs as there are job vacancies when the

unemployment rate is around five percent. I believe that the only way we can get the unemployment rate below five percent for any appreciable length of time without generating an unacceptable rate of inflation is to improve the working of the labor market so as to get people and jobs together more quickly. I also believe that such improvements in the working of the labor market are not likely to take place within the next decade.

Economic growth prognosis

I believe that the capacity of the U. S. economy to produce goods and services will grow less rapidly during the next decade and a half than it has grown since the late 1950's. I doubt that this capacity will grow by more than about four percent per year. The main bases for my belief are (1) the labor force will grow less rapidly during the next ten to fifteen years than it has grown in the recent past and (2) energy and other raw materials will be less easily available in the future than they have been in the last decade or two.

Role of the government in economic affairs

Federal government purchases of goods and services currently amount to about eight percent of the U. S. Gross National Product. This is as low as they have ever been since the end of World War II. (For example, Federal government purchases absorbed more than thirteen and a half percent of GNP in 1958 and more than twelve percent of GNP as late as 1968.) In contrast Federal government expenditures are currently in the neighborhood of twenty-three percent of GNP and this is as high as they have been in the post-war period.

The difference between government expenditures and purchases is government transfer payments (payments for which no services are rendered, such as social security benefits, veterans benefits, welfare payments, grants to state and local governments, interest on the national debt, etc.). The dramatic difference between the behavior of Federal government expenditures and purchases in recent years illustrates the changing role of the Federal government in our economy. Through its transfer expenditures, the Federal government has

a much stronger influence upon the distribution of private incomes than ever before and I doubt that this influence will diminish within the next decade or two.

The Federal government has also increased its direct regulation of private economic activity in recent years (e.g., the creation of the Environmental Protection Agency and the passage of legislation designed to improve on-the-job safety and health environments.) Although President Ford and others have advocated the elimination or at least the relaxation of some governmental regulations of business (particularly when the effects of the regulations appear to protect individual firms from the rigors of competition in the market place), I doubt that there will be any significant decrease in governmental regulation of private producers in the years ahead.

# SOCIAL TRENDS, ISSUES AND NEW DIRECTIONS IN AMERICA AND THE WORLD

Douglas Ensminger
Professor, Rural Sociology
University of Missouri--Columbia

While I assume responsibility for the selection and wording of the social trends and issues included in this "working paper," I want to acknowledge the assistance given me by thirty colleagues representing a wide range of desciplines and positions. I am especially indebted to my son, Dr. W. Douglas Ensminger, Associate Pastor, First Presbyterian Church, Beloit, Wisconsin, for the depth of insights on religion and the church.

Though the list might be longer than one would wish, I have resisted the temptation to consolidate or arrange on a basis of importance. What is significant is that all the trends and issues listed are identifiable. The impact of these trends on the future may be clearly predictable for some, and to others highly speculative.

## SOCIAL VALUES

1. The present generation of young people is less concerned about success measured in economic terms. They are moving toward more humanistic values, expressing concern for others and seeking a simpler way of life.

2. There is a trend toward earlier and earlier retirement, shorter hours, with increased emphasis on leisure time. Following retirement, many will seek opportunities for significant community involvement; and increasing numbers will move toward second and third positions.

3. U.S. is moving toward more conservative thought.

4. Both leaders and the general public are expressing concern about the dangers of technology and increasingly question whether or not all technology, when applied, will be in the best interest of society.

5. Economic pressures will subside, resulting in slower pace and greater value on leisure.

6. The trend toward a class society in the U.S. will continue, especially between intellectuals and blue collar workers.

7. If our traditional value of people based on performance is to prevail, people need to have evidence they will be rewarded on the basis of performance and not because they are members of either an elite or minority group.

8. With respect to the aging, our scale of values is wrong. We move people from full employment to social security with half the income.

9. Increasingly, our values and cultural responses to what we believe and will accept are being shaped by the media.

10. The moral fiber of America continues to degenerate indicating institutional and individual weakness.

11. An important value issue facing America is that of free choice versus social control.

12. The large coroporations having control over massive wealth lack social concern and are motivated almost exclusively by monetary values.

13. Attitudes of discouragement, disenchantment and lack of trust in America are widespread. There is a general need of respect for property and rights of others.

INSTITUTIONS IN GENERAL

1. Institutions in general are self-centered, self-serving and lack the capacity for individuals to participate in change.

2. Institutions lack the capacity to take a long term look. Their interest is here and now and in preservation of their present status.

3. Whereas in the sixties young people rebelled against institutions and establishments, they are today working for change within the institutional structures.

4. Distrust in bigness, be it government, corporation, institutions, universities or area-wide higher education systems, is widespread in the U.S.

5. Institutions do not today envision positive roles for women.

6. Institutions provide no meaningful way for people in retirement to express themselves up to the time of their death.

7. None of our institutions knows how to manage death.

THE FAMILY AS AN INSTITUTION

1. World pressures for a more equitable sharing of the world's resources and the increasing cost of energy will compel families to accept a less materialistic and lower level of living.

2. Morals will continue to be defined by society out of crisis with less emphasis on the institution of marriage for sanctioning sex relations.

3. The family as an institution will be under increasing stress as men and women seek equal status and roles. This will be most pronounced in professionally oriented men and women.

4. Following an increased sharing of controls within the family and the roles of women become more dominant, the family will be under increasing pressure to meet the emotional needs of the family.

5. While the family as a value oriented institution has been drifting, it is still the basic institution concerned with instilling and preserving values.

6. Whereas in the traditional American family women played the key role in transmitting values, with women now playing competing roles with men, value responsibility within the family will increasingly be shared by both men and women.

EDUCATIONAL INSTITUTIONS

1. Advances in science and technology require greater applied emphasis in technology in post-secondary education. Emphasis on applied technology seems likely to be the primary role of junior colleges in the future.

2. Higher education is losing its power base.

3. Higher education will in the future give higher priority to minorities and the aged.

4. As financial pressures heighten, public supported higher education will shift from present emphasis on accessibility and a right to all students, to discriminating in terms of those who can meet entrance requirements and profit from higher education.

5. In higher education, the need will intensify to prepare students intellectually and for them to apply their intellect in economic, social, cultural and political pursuits.

Because of the complexities of the problems ahead, there will be greater need for broad based liberal arts education in contrast to narrow vocational and technical education.

The danger is that education is being equated with jobs rather than with helping students find a large mearsure of self-fulfillment.

The need will be for greater intellectual skills instead of technical skills.

6. When thinking about education for women students, it will be wise to visualize those who seek equality of roles with men likely moving through two to three career paths.

7. In the U.S., the institutions of higher learning could, if they had national policies in support, contribute significantly to reducing unemployment by lengthening the time spent in a university. The alternative could be public works programs.

8. The universities lack the built-in institutional mechanism to think differently about the future than they did in the past; and therefore, they continue to perceive their roles in the future as being a continuation of the past.

9. Because of financial constraints now real in higher education, universities will be compelled to limit offerings and will be less comprehensive in offerings.

10. Higher education will be less rigid in defining its role to serve a narrow age group and will offer more non-traditional programs for adults and the aged.

11. The U.S. appears to be at sea, lacking goals and priorities for education.

12. The trend in higher education is toward larger and larger educational complexes which, in turn, have less and less built-in institutional competence to change.

RELIGIOUS INSTITUTIONS

1. Religion and the church as an institution are here to stay.

2. Since the churches have historically functioned as being supportive of our American way of life, it logically follows as America becomes more conservative, so will the church. The recent growth in church membership in the U.S. is from the conservative denominations.

3. The church has lost its dominance in value formulation. But faith in educational institutions to take over value roles has also declined.

4. The disenchantment of youth with religion, as expressed in the sixties, has subsided.

According to a Gallup Poll in 1975, nation-wide church-going remained at the same level as the four previous years, with 40 percent of adults attending church or synagogue in a given week.

As many young adults (18 to 29 years old) as older people participated in religious activities other than church services in the test week.

5. Traditionally, the church's role has been to be supportive of the American way of life and cultural values. This will continue and the church will increasingly seek opportunities to serve as a prophet on social issues and ills. The church will tend to identify the American way of life with the Kingdom of God.

6. Campus ministries have fallen on hard times largely because campus ministers were involved with student uprisings during the sixties.

The present generation of students sees the campus ministry as spiritually bankrupt.

7. The church will play an increasingly unique international role supported by a minority who will speak out and involve the church in international commitments.

8. While the trend in church membership in relation to total population is likely to continue, there is strong evidence to suggest a trend toward increasing commitment of members to religion and the church with implications of a more influential role of the church in the future.

ISSUES HAVING SIGNIFICANT AND IMPLIED NEW DIRECTIONS FOR AMERICA AND THE WORLD

1. Given the western outlook which is inward and void of understanding of the long history of our development as a major industrial nation, the people in the U.S. have little understanding of the interdependence of U.S. industrialization, agricultural development and America's high materialistic level of living with the mineral resources of the world.

2. American agricultural institutions are self-centered and not tuned to world issues. American agriculture lacks a unified and effective power base to participate in formulating national agricultural policies and to be supportive of interrelating American agricultural policies and world issues.

3. Needed in America is a broadening and deepening of understanding of the role world trade can have in improving the economy of the Developing Countries, and the interdependence of the state of the U.S.'s economy and that of the Developing Countries throughout the world.

4. Whereas in the past the U.S. has been a high consuming society, in the future we will need to move toward more saving--both in the monetary and the material elements of living. We will move away from being a "throw away society" to a recycling society.

5. Whereas today the pople in the U.S. tend to assume science and technology can solve all problems, in the future we will come to understand that the problems of both the U.S. and the world will become increasingly complex and will be a mixture of social, economic and political forces.

6. A major social issue of the future is to initiate a change in the role of technology. Our present orientation is that man serves technology; needed is for technology to serve man.

7. Because of the growing complexity of problems, major decisions facing institutions and governments will be management decisions. Individuals will have fewer and fewer options for free choice.

The big issue will be how to become accustomed to making major complex decisions in a changing world which will increasingly be influenced by social, economic and political variables.

8. The American public is generally indifferent to both national and international issues. People's basic concern is for self, not that of humanity.

9. The unwillingness of economic classes, both within the U.S. and the world, to work together to improve the quality of life for all the people seems likely to persist in the future.

10. On the world scene, the risk will be ever present to resolve world problems through explosion of atomic bombs. Restraints, compromise and sharing of resources must through UN be pressed as alternatives to the bomb.

11. The media, which places emphasis on the "sensational" as headline stories, is contributing to the public's inadequate understanding about complex issues and problems.

12. The growth in wealth and political power of large corporations has aided in moving U.S. increasingly toward a controlled society.

13. As the U.S. moves toward zero population growth, we can anticipate far reaching institutional, as well as economic, social and political, implications.

14. It would seem to be inevitable that socialization will continue both within the U.S. and the world, and that government will be looked to for providing more services.

15. Government regulations in the U.S. are today strangling individual initiative of small enterprises and creating unemployment.

16. Through application of intermediate technology and labor intensity, small acreage units in the U.S. will increase; and added numbers of families will thereby improve their quality of life.

17. A population trend having far reaching implications is the marked growth in the number of older persons and a declining birth rate.

On the basis of current estimates of lengthening life expectancy and a birth rate that is barely at replacement level, the median age of the population is expected to increase by six years (to 34.8) over the next decade. The population age 75 and older will grow by 2 1/2 times the rate of the population as a whole.

By 1990, the dependency ratio, or the number of workers per retired person, will drop from 4.6 to 3.5.

The shift in age structure may require a re-examination of retirement age policies.

18. In general, social programs both in the U.S. as well as the Developing Countries, are today evaluated on the basis of their economic viability. Many needed social programs should be accepted as requiring subsidies, simply for the contribution they make to improving the quality of life.

19. The trend toward concentration of population in urban areas and the fringe areas of metropolitan cities will continue both in the U.S. and throughout the world.

The crisis of the cities will continue until the political and ecological boundaries are coterminous.

20. Women are one of each nation's best and underused resources. Because of the cultural influences that have placed women in their traditional roles, it will take a long time for society to accept competing roles with men, and for women to achieve significantly more open and productive roles.

21. Race relations in the U.S. will continue to improve. Economic opportunity will, more than any other factor, contribute to improved relations.

Our objective must be to work for an increasingly open society.

22. Alcoholism is a major social problem in America. There is growing acceptance of drinking.

23. The continued use and abuse of drugs by both young people and adults is an intense social problem in the U.S.

24. America's early and persistent commitment to work ethics is changing in that increasing value is being placed on work being self-satisfying and in there being an increasing quest for leisure. But work continues to be a high value in America in getting ahead.

25. Throughout American history, many traditionalisms have given way to national programs and again assert themselves. One such traditionalism which is again asserting itself is "return to the people" the right and responsibility to manage programs which directly impinge on their daily lives.

26. A worldwide issue, prevalent in America, is the complex contradiction in values related to the abundance and persistence of poverty.

27. Achieving a higher quality of life has become an objective of most workers in America. Wages and fringe benefit system, rather than how hard one works on the job, are dominant in how the American dream is realized.

28. Since few significant social changes come about without crisis, violence will continue to be an integral part of the process of black-white, minority accomodations and integration of schools and housing.

29. Pressures will mount in both the U.S. and throughout the world in support of equality of opportunity and quality of life.

30. The U.S. faces a period of conflicting social desires, lower expectation and economic domination by those who control mass wealth.

31. There is today at all levels of government--national, state and local--an imbalance between what the people expect of government and what the people can and will pay for the demanded services.

32. For the Developing Countries as well as America, inflation adds to the burden of the poor and increases the percentage of people who live in poverty. This process will breed discontent and lead to political turmoil and violence.

33. Water is likely to be America's major problem for domestic, industrial and agricultural use. Water can be expected to create major environmental and political tensions.

34. Given the trend of continuous population mobility, there will be a continuous weakening of community identification with neighbors, problems and issues of the area of residence.

35. The U.S. farm population will level off at about 3 to 4 million but with increased stratification.

Commercial farmers will be between 1 and 2 percent of the U.S. population. The commercial farmer will be without a power base and will be a unique social phenomenon.

36. The trend in America is toward conservatism, especially among the laboring class.

37. The world's population-food-energy crisis brings to the forefront the present low state of humanistic values in the U.S.

38. The U.S. is no different from the Developing Countries when it comes to those who control massive wealth perpetuating class struggle.

39. The U.S. is presently creating a class of people who control mass wealth, made possible by windfall profits and tax loopholes.

40. Institutions throughout the U.S. are not adequately involving people in formulating policies for sharing food with the world's needy and for the world's resources to be more equitably shared with the world community.

41. On a worldwide basis, we talk for improving quality of life; but nations are committing more and more of their budgets for arms. The nations that are massing great profits from sale of resources are now investing their new wealth in arms and will increasingly exert control over the world.

42. Out of frustration about such issues as the growing population, how to feed the world and the by-passed people, the American people are concluding they can do nothing, and therefore, are accepting the world's ills with an attitude of indifference.

43. America and the world lack great leaders essential to inspire us to greatness.

44. The U.S. is now in a post-industrial era, with about 1/3 of the people employed in manufacturing industries.

We are rapidly becoming a service-oriented society. A service-oriented society means more, not less government. Within a service-oriented society, there will be more and more confrontation between special interest groups, such as occurred between the labor unions and agriculture over the sale of wheat to Russia.

45. On a worldwide basis, we can expect deepened tension between the have and have not nations.

46. For the U.S. to be effective in foreign affairs, it is essential that the American people have a sense of participating, through their elected representatives, in formulating U.S. foreign policy. Of equal importance will be for the American people to understand the rationale back of the foreign policies of the foreign governments.

47. If the world community is to succeed in providing the conditions to improve the quality of life for all the people, the U.S. should join in changing priorities from expenditures for arms to expenditures to eradicate poverty. World poverty must be accepted as a social disease, and its eradication must be tackled in much the same way the world community joined in wiping out smallpox.

# CONTRIBUTIONS OF AGRICULTURAL BUSINESS AND INDUSTRIES TO STATE, NATIONAL, AND WORLD ECONOMIES

Harold Halcrow
Department of Economics
University of Illinois at Urbana-Champaign

For optimum development of the U.S. economy, the new directions in education must work toward greater rural-urban interaction and understanding. This involves a more complete grasp of the interdependence among the sectors of agriculture, and between agriculture and other industry. The task is to more completely understand how local and state issues integrate with growth and prosperity in our nation and the world.

The strength and growth of agriculture and food production since the early 1920's have been built on the advances in science, organization, and management, strongly supported by a dynamic growth in agricultural business and industry. The land base has expanded scarcely at all, and the number of people required to manage and labor on our farms and ranches has declined. In a real sense, it is the growth in agricultural business and industry that has put scientific discoveries into use, expediting advances in productivity on the farm and in our entire food system. The agribusiness firms that serve farmers and ranchers have transformed new technological developments such as improved seeds, fertilizers, and pesticides, into practical production inputs, thus making them widely available. These inputs have increased labor efficiency steadily. To understand the basis for growth and prosperity in agricultural business and industry is to grasp a major part of the significant development potential of our society.

Agricultural business and industry has made essentially three contributions to the U.S. economy. First, total output of two and one-half times since the early 1920's corresponds with the simultaneous development of agricultural cooperatives and private business in the agricultural service indus-

tries and in the processing and marketing of farm products. Second, agricultural business and industry has contributed to the change in economic structure of our society. Resources have been saved and transferred for productivity outside of agriculture. At the same time, both farm and nonfarm firms have declined in number and increased in size. Although not all the societal effects of this change have been desired or are desirable, on balance a much more efficient system has been developed that is serving the nation much better than it did in the past. Third, the growth in agricultural business and industry has contributed greatly to a high level of living based on an abundance of food, to more than $20 billion of commercial exports from agriculture, and to a potential for substantial food aid to developing countries in Asia, Africa, and South America.

In the future ways must be found for agricultural business and industry to operate most efficiently and still save essential minerals and other resources. Although the total energy used by the entire farm-food system has been estimated to be only 13 to 14 percent of all energy used in America, total food-system energy has been increasing. Certain parts of the system--especially farming, food processing, refrigeration, and cooking--are highly dependent on petroleum and natural gas, which are expected to be most critical in supply. Increase in farm output and the food supply is closely correlated with the entire growth of the agricultural business and industry complex. To get growth in this system while still conserving essential basic resources will be extremely difficult.

More attention must be paid to the types of balance wanted between rural and urban society in terms of the economy, the concentration of population in the cities, and the support for rural-community development. In terms of our gross national product, allocations for rural development have been scarcely measurable, except for support of agricultural credit services, rural electrification, and special area programs such as TVA.

A broader and deeper understanding is needed of the relationship of the

United States to world economies. Such an understanding can avoid wasteful efforts such as we have made in the past or can lead the nation into more helpful and productive endeavors. Food deficits of the developing nations will increase in the future. How will the United States respond in terms of national policy? Answers to such questions will determine what contributions agricultural business and industry will make to our welfare in the future, how it will be made, and who will benefit. Finding the answers is one fo the challenges for our educational system in the years ahead.

# Trends, Issues and New Directions in American Education

Ralph W. Tyler
Science Research Associates
Chicago, Illinois

1. Trends

   1.1 Stable population

   1.2 Stable economy without marked increased support for education.

   1.3 Initial erosion of the educational experiences provided outside of school, followed by efforts to rebuild the total educational system.

   1.4 Continued increase in employment in the service sector with reductions in the material production sector.

   1.5 Continuing relatively high level of unemployment in the private sector.

   1.6 Increase in numbers involved in continuing education.

   1.7 Continuing concern for the education of the "disadvantaged," for education for career and occupational development, for "character education," for effective transition of youth into constructive adult roles.

2. Issues

   2.1 Level of financing for public schools and colleges.

   2.2 Ways of rebuilding the "comprehensive educational system."

   2.3 Developing new patterns of education for adults while quality is maintained.

   2.4 Whether to establish special schools for the gifted and the disadvantaged.

   2.5 Role of schools and colleges in occupational education.

   2.6 Responsibility of the non-school community agencies and institutions for the education of children and youth.

3. New Directions

   3.1 Community and metropolitan councils for educational planning and governance.

   3.2 Non-traditional programs of continuing education.

3.3 Special task forces in schools and colleges to attack critical problems.

3.4 Development of patterns for sharing financial support.

3.5 Management by objectives applied to educational programs.

# LISTENING PANEL REPORTS

## Project 2000 Forum

## RESPONSIBILITIES OF LISTENING PANEL

The Listening Panel was asked to carry out two tasks. These tasks were to:

1. Identify future developments and directions in the fields of education, agriculture, psychology, business, sociology, morality, and economics that will affect agriculture and agribusiness education in Iowa in the next one or two decades. More specifically, the panelists should describe those aspects of each anticipated development that bear most significantly on agriculture and agribusiness education.

2. Develop a list of implications for changes in agriculture and agribusiness education programs based upon future developments and directions as described in the disciplines above.

# FUTURE DEVELOPMENTS AND DIRECTIONS

Identified by

The Listening Panel
Project 2000 FORUM

In order to make a more readily analyzed list of future developments and directions, the project staff divided this report of the listening panel into seven areas. These areas were: on-farm agricultural developments and directions; off-farm agricultural developments and directions; educational developments and directions; sociological developments and directions; economic developments and directions; ecological developments and directions; and political developments and directions.

No attempt was made to rank order these developments and directions in terms of their relative importance.

## I. On-Farm Agricultural Developments and Directions

1. Farming will continue to become a more complex business.
2. The number and political power base of commercial farmers will decrease.
3. The number of family farm corporations will continue to grow.
4. There is a continuing yield revolution in the production of crops and livestock.

## II. Off-Farm Agricultural Developments and Directions

1. There will be a continuing rapid explosion of agricultural technical knowledge.
2. There will be fewer and larger agricultural marketing and supply service organizations.
3. There will be an increasing number of people going into agriculturally related occupations who do not have agricultural backgrounds.

## III. Educational Developments and Directions

1. There will be continued concern of education for the disadvantaged.
2. There will be continued concern of education for career and occupational development.

3. There will be continued concern of education for character development.
4. There will be continued concern of education for effective transition of youth into adult roles.
5. The management by objectives approach will be increasingly used in conducting educational programs.
6. Community, area, and metropolitan councils for educational planning and governance will become increasingly important.
7. Levels of financing public schools will continue to be pressured.
8. More decision making skills will be taught in schools.
9. The cost-benefit ratio in career selection may undergo substantial change.
10. There will be a major change in vocational guidance.
11. Testing as a means of career placement and selection will continue to face strong criticism.
12. There will be more competition between agricultural education and other vocational education programs.
13. Due to future decreases in high school enrollments in the United States, there will be consolidation of schools and/or school closings.
14. Safety education will become a more important part of school curricula.
15. Modular scheduling with semester and/or quarter courses will contine to grow at the high school level.

IV. Sociological Developments and Directions

1. Pressure groups:
   A. Consumer influences will continue to increase, and consumer pressures will continue for cheap food and fiber.
   B. There will be an increasing influence of the mass media upon agriculture.
   C. Special interest groups will have increasing influence on governmental policy, decisions, and actions.
   D. Agriculture will become increasingly involved with other societal groups (e.g. minorities, organized labor, etc.).
2. Women will serve a more active role, both in numbers and in status.
3. Early retirement will continue to result in wasted human resources.
4. The trend toward concentration of population in urban and suburban areas will continue.

5. The United States will become a less production and more service oriented society.
6. A shorter work week, especially for the blue collar worker, will continue.
7. Society will change as a result of energy availability and use.
8. There will be more accrediting, certifying, and licensing in all phases of agriculture and society.
9. There will be continued efforts to solve problems by organization and reorganization.
10. There will be a continual emerging of a class structure in the United States.

V. Economic Developments and Directions

1. Continuing inflation is causing more hunger and more malnutrition than lack of food per se.
2. The rate of inflation will decrease and stabilize dring the next 10-15 years assuming that the United States does not become involved in any major conflicts.
3. The unemployment rate will decline to not less than 5% in two to three years, and it will probably stabilize at 5½% unless people and jobs can be brought together more efficiently.
4. The interdependence of U. S. industrialization will continue to grow.
5. The United States population and economy will stabilize without marked increase in support for education.
6. World trade will continue to expand in agricultural products.
7. New occupations or new forms of existing occupations will continue to emerge.

VI. Ecological Developments and Directions

1. Energy and raw materials will become less easily available.
2. The U. S. is moving from a consuming to a recycling society.
3. Water will increasingly become a major resource problem.

VII. Political Developments and Directions

1. Special interest groups will have increasing influence on the government.
2. There will be greater governmental regulation of agriculture.
3. World-wide deepened tensions between "have" and "have not" peoples will continue.
4. Political pressures will continue for cheap food and fiber.
5. There will be shifts in governance to more decentralized forms ( e.g. federal to state, state to county).

# IMPLICATIONS OF FUTURE DEVELOPMENTS AND DIRECTIONS

## Listening Panel Report

## Project 2000 Forum

Based on the preceeding lists of future developments and directions, the following implications were identified.

I. Implications for Program Restructuring:

1. Programs must be based upon local community needs.
2. There must be instructional emphasis is locating and using available information resources.
3. Those engaged in agriculture will have to be more aware of the various interest groups in society.
4. Students must be exposed to the beliefs and concerns of the various segments of society which have a bearing on the way in which food is produced.
5. Public supported education will be expected to do more and more, but will not receive more money.
6. Schools should provide more emphasis on moral, social, and economic values.
7. There is a greater need for post-secondary and continuing education in agriculture.
8. Agriculture and agribusiness education must serve both rural and urban populations.
9. Intensive instruction must be provided to meet the special needs of commercial farmers.
10. There needs to be greater emphasis in instruction in areas of agricultural services.
11. Evaluation of the program must be made in terms of realistic short and long term goals.
12. Educational experiences must be provided in agriculturally related avocational and recreational activities.
13. At least part of the program in agriculture and agribusiness education must prepare and fit into non-formal delivery systems.
14. Year-round educational opportunities must be expanded.
15. There will be increased emphasis on multiple man departments of agriculture and agribusiness education.
16. There is a need to further restructure the agricultural comprehensive educational system.

II. Implications for Curriculum:

Subject Matter Content:

1. There needs to be increasing instructional emphasis upon entry-exit problems, organizational agreements, use of credit, marketing, zoning, computers, record keeping, and the decision making process.
2. There needs to be increasing instructional emphasis upon consumer demands and other forces that affect farm operations such as prices, controls, legislation, taxes, imports, and exports.
3. There needs to be increasing instructional emphasis upon basic reading, writing, and speaking skills, and the ability to discern the difference between fact and fiction. Students must learn to deal with the mass media, and learn how to use it.
4. Instruction should be provided in genetics, livestock nutrition, crop nutrition, disease and pest control, management practices, and physiology.
5. Better input management ( e.g. machinery, fuel, fertilizer, etc.) teaching will be needed for youth and especially for adult and young farmers.
6. More instruction and emphasis on preventative maintenance of machinery will be needed.
7. Governmental regulations must be explained to students, as well as the effects which those regulations have on the farm business decison making practices.
8. There needs to be greater emphasis on resource conservation and environmental control.
9. More opportunity must be provided for leadership development and cooperative group activities.

Understanding and Appreciation Development:

1. The curriculum should include:
    (a) Understanding of trends, problems, and issues in world food production and distribution.
    (b) Dispelling the idea that the U. S. farmer can feed the world.
    (c) Consideration of possibilities of sharing our resources to help developing countries help themselves.
2. Students will need to realize the impact of the technology that they use, not only on increased production efficiency, but on all other avenues of society.

3. Students need to be taught better methods of job selection so that they will select jobs which are satisfying to them.
4. Students must be made acquinted with the different forms of energy available.
5. Agriculture and agribusiness education must place greater emphasis on the interdependence of agriculture and other phases of the U. S. and World economies.
6. Students must be taught to compare the relative benefit of college training in agriculture versus the opportunity to enter farming or agribusiness directly, utilizing vocational agriculture and other recurrent education programs.
7. Agriculture and agribusiness education should remain cognizant of changes in energy cost and supply.
8. Agriculture and agribusiness education should consider the input-output ratio in agriculture production.

III. Implications for Teaching Approaches

1. Agriculture and agribusiness education should have a principles and practices oriented curriculum (for many students there should be increased emphasis upon biology and chemistry).
2. A more humanistic approach may be needed.
3. Agriculture and agribusiness education should make more effective use of resource persons, especially retirees with special qualifications.
4. Agriculture and agribusiness education should expand occupational experience programs.
5. Agriculture and agribusiness education will continue to utilize the following kinds of skills and techniques: exploration of agriculture, related career options, problem-solving, goal setting, the study of alternatives in resource management, judging contests and other FFA activities.
6. More guidance responsibilities will be given to individual agricultural teachers.

Note: These implications were placed in their respective categories by the project staff.